UNCONSOLIDATED AQUIFER SYSTEMS OF DEARBORN COUNTY, INDIANA

Dissected Till and Residuum Aquifer System

This aquifer system, which covers about 92 percent of Dearborn County, has the most limited ground-water resources of the unconsolidated aquifer systems in the county. The Dissected Till and Residuum Aquifer System predominantly consists of extremely thin pre-Wisconsin till deposits with very thin layers of sand and gravel, or thin, eroded bedrock residuum. Total thickness of this aquifer system generally ranges from about 15 to 40 feet.

There is little potential for water production in the Dissected Till and Residuum Aquifer System in Dearborn County. However, this aquifer system is commonly chosen for well development rather than the underlying bedrock. Potential aquifer units within this system include thin sand and/or gravel layers that are typically less than 2 feet thick and are generally separated by tills within the saturated zone. Large-diameter bored (bucket rig) wells are commonly used in this county to produce water from these thin seams of coarse-grained material. Typically constructed at depths of 30 to 45 feet with 30-inch diameter porous casing, these wells are built to maximize storage and are generally adequate for domestic use. These wells typically yield 0.5 to 6 gallons per minute (gpm) and static water levels are generally 12 to 20 feet below land surface. This system is not very susceptible to contamination from surface sources because the near-surface materials generally have low permeability.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

In Dearborn County this system is mapped along portions of tributaries of the Whitewater and Ohio Rivers. The most notable of these tributaries is Laughery Creek at the southern county line. The Alluvial, Lacustrine, and Backwater Deposits Aquifer System consists of deposits that come from two primary sources. The first is alluvium deposited by streams along with colluvium eroded from valley walls and upland areas. The second is from pre-Wisconsin and Wisconsin fine-grained glaciolacustrine deposits formed in relatively stagnant lake water. Typical materials include fine sand, silt, and clay deposits that are commonly greater than 25 feet thick.

Few wells produce from the Alluvial, Lacustrine, and Backwater Deposits Aquifer System in Dearborn County. Throughout much of this system, large-diameter bored (bucket-rig) wells are commonly used to produce water from sand and gravel units within the predominantly clay and silt materials of this aquifer system. Constructed at depths of 25 to 50 feet with 30-inch diameter porous casing, these wells are built to maximize storage. Reported capacities for these wells are 0.5 to 6 gpm. However, there is greater potential in downstream areas near the Whitewater and Ohio Rivers where deposits of coarse-grained materials are thicker. The few wells completed in these areas have reported capacities of 20 to 150 gpm, although this aquifer system would not typically support high-capacity usage.

Thick deposits of silt and clay that have a low susceptibility to surface contamination generally mark this aquifer system. The susceptibility is greater in areas where the surficial silt and clay deposits are thin and directly overlie outwash deposits.

Pre-Wisconsin Drift Aquifer System

The Pre-Wisconsin Drift Aquifer System is mapped as small isolated areas in the northwestern part of Dearborn County. These small areas were once connected but downcutting by streams has separated them and reduced their areal extent. This aquifer system predominantly consists of pre-Wisconsin glacial materials that range in thickness from about 30 to 80 feet.

This aquifer system is generally capable of meeting the needs of domestic users. In Dearborn County, nearly all of the reported wells penetrating this system were completed in unconsolidated materials rather than in the underlying bedrock. Potential aquifer materials within the glacial till include discontinuous intratill sand and gravel layers. Individual sand and gravel units are commonly 2 to 6 feet thick. Wells in the Pre-Wisconsin Drift Aquifer System are commonly completed at depths ranging from 30 to 50 feet with 30-inch diameter porous casing to allow for maximum storage. Domestic wells typically yield from 1 to 10 gpm and static water levels are generally 15 to 25 feet below land surface. Wells constructed in this system in Dearborn County would not typically support high-capacity usage. However, there are several wells capable of producing at least 100 gpm from the Pre-Wisconsin Drift Aquifer System just across the county line in Ripley County (about 2.5 miles west of Hubbells Corner). Most of these wells are associated with the Sunman public water supply facility.

The Pre-Wisconsin Drift Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are generally separated from the surface by till layers within the system.

Whitewater Valley Aquifer System

In Dearborn County, the Whitewater Valley Aquifer System is mapped in the main valley of the Whitewater River. This valley carried great quantities of outwash from the melting glaciers during the Wisconsin and pre-Wisconsin glacial times. This aquifer system contains large volumes of sand and gravel that partially fill the main river valley. As the glaciers melted, the sediment contained within them was delivered to the Whitewater River in quantities too large for the stream to transport. As a result, the increased sediment load was stored in the valley as vertical and lateral accretionary deposits. As long as the retreating glaciers continued to provide sediment in quantities too large for the stream to transport farther downstream, the valley continued to be filled.

The Whitewater Valley Aquifer System is about 40 to 140 feet thick in Dearborn County. However, not all of these unconsolidated deposits are saturated with water. Actual aquifer thickness (saturated sand and gravel) of this system ranges from about 10 to 80 feet, but the typical aquifer thickness is 20 to 40 feet. In some areas 5 to 15 feet of sandy clay or silt overlie the aquifer materials. Well depths are commonly 45 to 65 feet. This aquifer system has the potential to meet the needs of domestic and high-capacity users in Dearborn County. Domestic well yields typically range from 12 to 25 gpm and static water levels are generally 15 to 25 feet below surface. There are 4 registered high-capacity facilities (9 wells) utilizing the Whitewater Valley Aquifer System in Dearborn County. Reported well yields range from 160 to 1000 gpm.

This aquifer system is highly susceptible to contamination from surface sources in areas that lack overlying clay layers. Where clay or silt deposits overlie the aquifer units, this system is moderately susceptible to surface contamination.

Ohio River Outwash Aquifer System

This aquifer system is mapped along the main valley of the Ohio River in Dearborn County. Aggradation of the Ohio River Valley with large amounts of outwash sand and gravel from pre-Wisconsin and Wisconsin receding glaciers filled the river valley. Recent alluviation continues to fill the valley. These outwash and alluvial deposits form the most prolific aquifer system in the county.

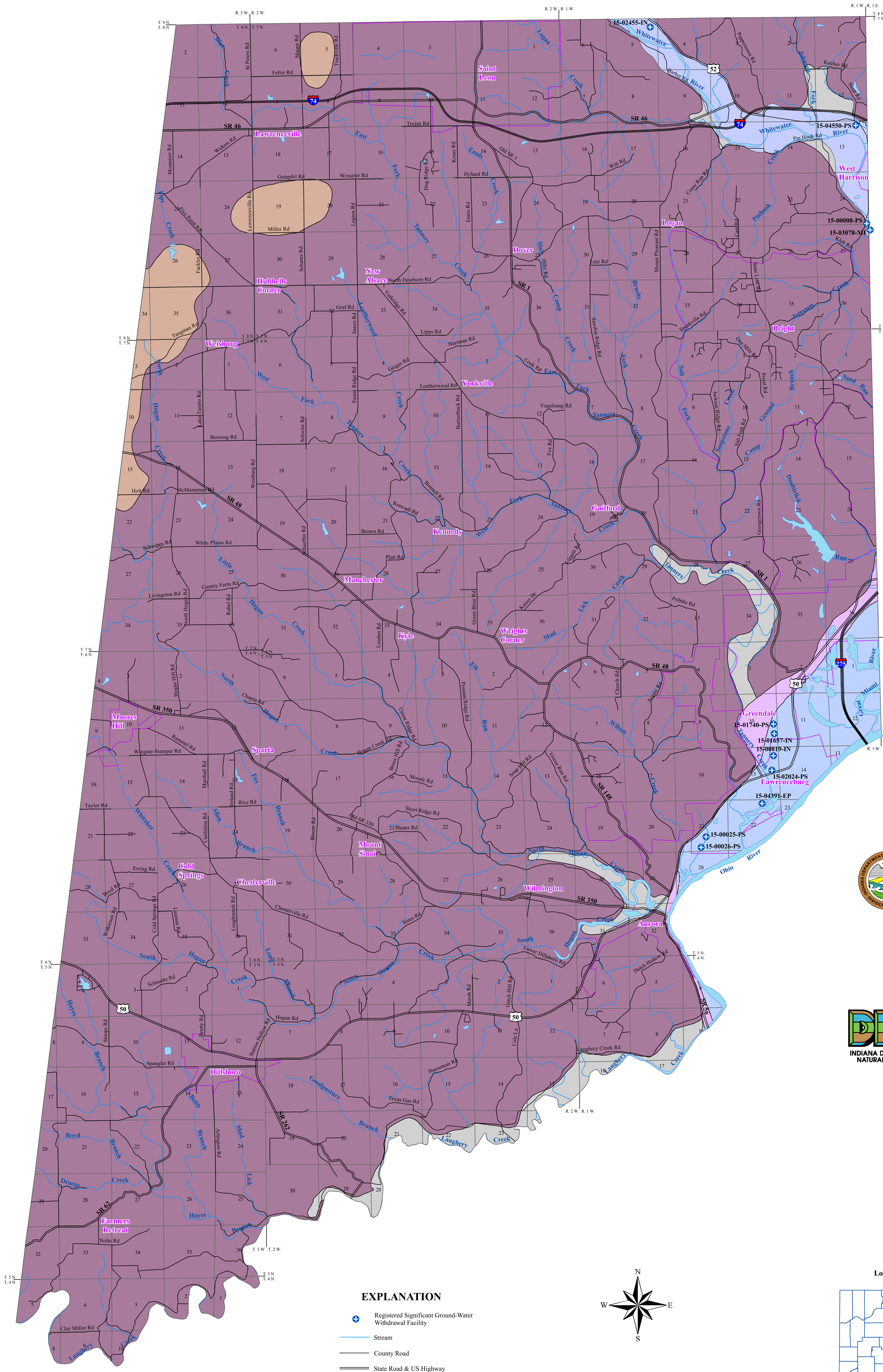
In places the Ohio River Outwash Aquifer System exceeds 150 feet in thickness with nearly 100 feet of continuous sand and gravel. However, the outwash is typically 40 to 70 feet thick with the thickness of saturated sands and gravels generally ranging from 30 to 60 feet. Well depths are commonly 65 to 110 feet. In some areas 15 to 35 feet of sandy clay or silt overlie the aquifer materials. The Ohio River Outwash Aquifer System has the potential to meet the needs of domestic and high-capacity users. Nearly all of the reported wells utilizing this aquifer system in Dearborn County are associated with high-capacity facilities. Seven registered significant ground-water withdrawal facilities (total of 25 wells) currently use the Ohio River Outwash Aquifer System in Dearborn County. Reported yields for high-capacity wells in this aquifer system are 450 to 3000 gpm with 1 collector well that been tested as high as 6000 gpm.

This aquifer system is highly susceptible to contamination from surface sources in areas that lack overlying clay layers. The system is only moderately susceptible where it is overlain by thick clay or silt deposits.

Ohio River Outwash Aquifer Subsystem

In Dearborn County, this system is mapped parallel to the Ohio River Outwash Aquifer System. In general, the Ohio River Outwash Aquifer Subsystem is mapped where the topographic position is higher and thickness of saturated outwash materials is considerably less than the main outwash system. Individual sand and gravel aquifer units are generally overlain by greater thicknesses of silt and clay.

There are few reported wells utilizing this aquifer system in Dearborn County. However, information from these wells and from wells in other counties where the Ohio River Aquifer Subsystem is mapped suggests that this subsystem in Dearborn County has the potential to meet the needs of domestic and some high-capacity users. Areas within this aquifer system that have overlying clay or silt deposits are moderately susceptible to surface contamination; whereas, areas that lack overlying clay or silt deposits are highly susceptible to contamination.



EXPLANATION

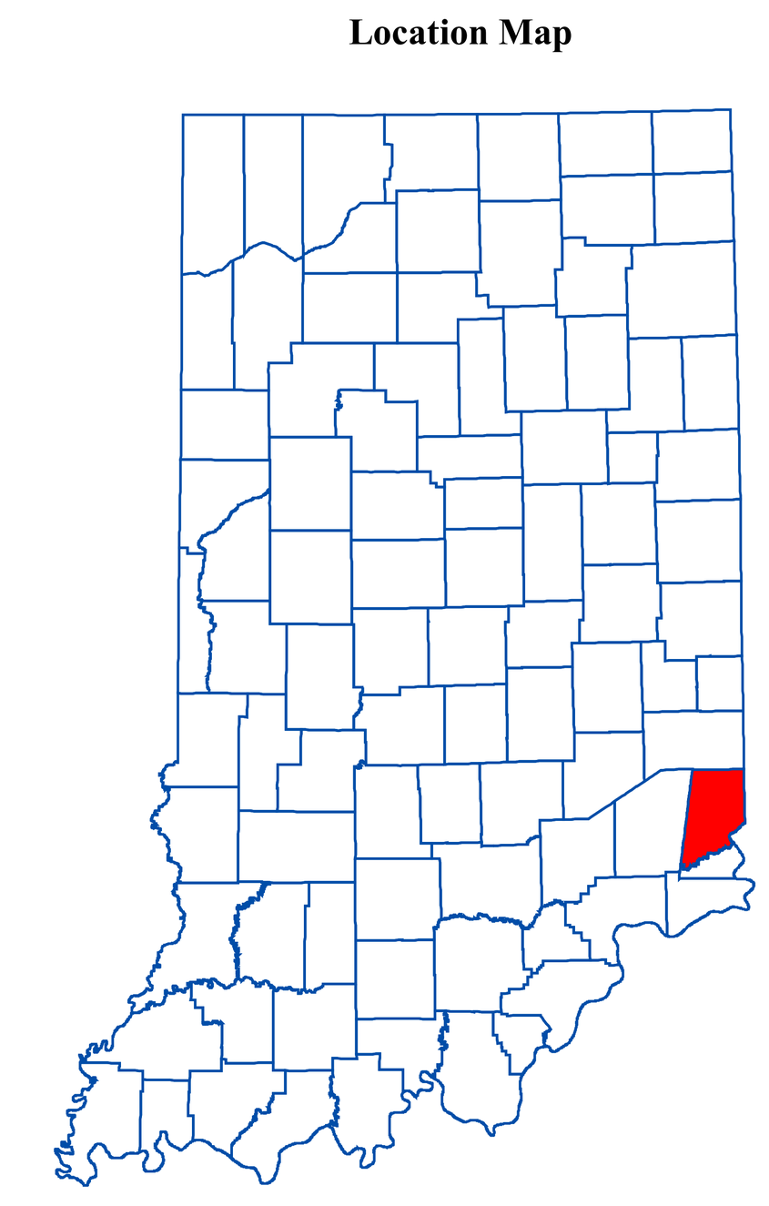
- Registered Significant Ground-Water Withdrawal Facility
- Stream
- County Road
- State Road & US Highway
- Interstate
- Lake & River
- Municipal Boundary

1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

INDIANA DEPARTMENT OF NATURAL RESOURCES

Location Map



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This map was created from several existing shapefiles. Township and Range Lines of Indiana (line shapefile, 20020621), Land Survey Lines of Indiana (polygon shapefile, 20020621), and County Boundaries of Indiana (polygon shapefile, 20020621), were all from the Indiana Geological Survey and based on a 1:24,000 scale. Draft road shapefiles, System1 and System2 (line shapefiles, 2003), were from the Indiana Department of Transportation and based on a 1:24,000 scale. Populated Areas in Indiana 2000 (polygon shapefile, 20021000) was from the U.S. Census Bureau and based on a 1:100,000 scale. Streams27 (line shapefile, 20000420) was from the Center for Advanced Applications in GIS at Purdue University. Unconsolidated aquifer systems coverage (Schrader, 2006) was based on a 1:24,000 scale.

Unconsolidated Aquifer Systems of Dearborn County, Indiana

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